

AMENDMENTS IN THE CLAIMS:

1. (Currently Amended) An optical disk apparatus comprising:

a motor for rotating an optical disk;

a light source;

diffraction means for diffracting a portion of light emitted from the light source to form a main beam of 0th order light and a pair of sub beams composed of +1st order light and -1st order light which are formed on both sides of the 0th order light;

an objective lens for converging the main beam onto a recording track of the optical disk and the pair of sub beams onto two tracks that are positioned at both sides of the recording track of the optical disk;

light receiving means for receiving the main beam and the sub beams reflected from the optical disk, and outputting electrical signals through photoelectric conversion;

a calculation section for, based on the electrical signals output from the light receiving means, providing a main push-pull signal MPP, a sub push-pull signal SPP, and a differential signal between the main push-pull signal MPP and the sub push-pull signal SPP; and

phase difference detection means for detecting a phase difference between the main push-pull signal MPP and the ~~differential signal~~ sub push-pull signal SPP,

wherein, in accordance with an output from the phase difference detection means, an offset is applied in a tracking control of the main beam with respect to the optical disk to compensate for an off-tracking caused by a phase shift of the differential signal.

2. (Original) The optical disk apparatus of claim 1, wherein the differential signal is a differential push-pull signal DPP.

3. (Original) The optical disk apparatus of claim 2, wherein the light receiving means comprises:

a main-beam photodetector having four split photoelectric conversion sections for receiving the main beam reflected from the optical disk;

a first sub-beam photodetector having two split photoelectric conversion sections for receiving one of the pair of sub beams; and

a second sub-beam photodetector having two split photoelectric conversion sections for receiving the other of the pair of sub beams, and

the calculation section further comprises:

first calculation means for determining the main push-pull signal $MPP = (A+D) - (B+C)$, based on signals A, B, C, and D obtained respectively from the four split photoelectric conversion sections of the main-beam photodetector;

second calculation means for determining the sub push-pull signal $SPP = (F-E) + (H-G)$, based on signals E and F obtained respectively from the two split photoelectric conversion sections of the first sub-beam photodetector and on signals G and H obtained respectively from the two split photoelectric conversion sections of the second sub-beam photodetector; and

third calculation means for determining the differential push-pull signal $DPP = MPP - \alpha \times SPP$ (where α is a constant), based on outputs from the first calculation means and the second calculation means.

4. (Previously Presented) The optical disk apparatus of claim 1, comprising:

signal amplitude calculation means for adjusting amplitudes of the main push-pull signal MPP and/or the sub push-pull signal SPP so that the amplitude of the main push-pull signal MPP and the amplitude of the sub push-pull signal SPP become equal;

signal summation means for calculating a sum of the main push-pull signal MPP and the sub push-pull signal SPP which are output from the signal amplitude calculation means; and

phase difference calculation means for, based on an output from the signal summation means, calculating a phase difference between the main push-pull signal MPP and the sub push-pull signal SPP.

5. (Currently Amended) An optical pickup device comprising:

a light source;

diffraction means for diffracting a portion of light emitted from the light source to form a main beam of 0th order light and a pair of sub beams composed of +1st order light and -1st order light which are formed on both sides of the 0th order light;

an objective lens for converging the main beam onto a recording track of an optical disk and the pair of sub beams onto two tracks that are positioned at both sides of the recording track of the optical disk;

light receiving means for receiving the main beam and the sub beams reflected from the optical disk, and outputting electrical signals through photoelectric conversion;

a calculation section for, based on the electrical signals output from the light receiving means, providing a main push-pull signal MPP, a sub push-pull signal SPP, and a differential signal between the main push-pull signal MPP and the sub push-pull signal SPP; and

phase difference detection means for detecting a phase difference between the main push-pull signal MPP and the sub push-pull signal SPP,

wherein, in accordance with an output from the phase difference detection means, an offset is applied in a tracking control of the main beam with respect to the optical disk to compensate for an off-tracking caused by a phase shift of the differential signal.

6. (Currently Amended) A driving method for an optical disk, comprising:

a step of converging a main beam onto a recording track of the optical disk and a pair of sub beams onto two tracks that are positioned at both sides of the recording track of the optical disk and outputting electrical signals based on the main beam and the sub beams reflected from the optical disk;

a step of, based on the electrical signals, providing a main push-pull signal MPP, a sub push-pull signal SPP, and a differential signal between the main push-pull signal MPP and the sub push-pull signal SPP; and

a step of detecting a phase difference between the main push-pull signal MPP and the ~~differential signal~~ sub push-pull signal SPP,

wherein, based on the phase difference, an offset is applied in a tracking control of the main beam with respect to the optical disk to compensate for an off-tracking caused by a phase shift of the differential signal.

7. (Original) The driving method for a disk of claim 6, wherein the differential signal is a differential push-pull signal DPP.

8. (Original) The driving method for a disk of claim 6, wherein the step of providing the differential signal comprises:

a step of determining the main push-pull signal $MPP=(A+D)-(B+C)$, based on signals A, B, C, and D obtained respectively from four split photoelectric conversion sections of a main-beam photodetector;

a step of determining the sub push-pull signal $SPP=(F-E)+(H-G)$, based on signals E and F obtained respectively from two split photoelectric conversion sections of a first sub-beam photodetector and on signals G and H obtained respectively from two split photoelectric conversion sections of a second sub-beam photodetector; and

a step of determining the differential push-pull signal $DPP=MPP-\alpha \times SPP$ (where α is a constant).